AF

DOCKET NO. I20 06739 US **PATENT**
CLIENT NO. HWEL01-06739
Customer No. 000128

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	:	Charles Q. Zhan, et al.
Serial No.	:	10/717,086
Filed	:	November 19, 2003
For	:	APPARATUS AND METHOD FOR IDENTIFYING DEFECTIVE VALVES
Group No.	:	2863
Examiner	:	Xiuqin Sun

MAIL STOP APPEAL BRIEF- PATENTS
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

The undersigned hereby certifies that the following documents:

1) Appeal Brief;
2) Fee Transmittal for FY 2006 (in duplicate);
3) Check in the amount of $500.00 for the Appeal Brief filing fee; and
4) Postcard receipt

relating to the above application, were deposited as "First Class Mail", with the United States Postal Service, addressed to MAIL STOP APPEAL BRIEF - PATENTS, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on **April 9, 2007**.

Date: April 9, 2007 Kathy Hamilton
Mailer

Date: April 9, 2007 William A. Munck
Reg. No. 39,308

Legal Department Docket Clerk
101 Columbia Road
P.O. Box 2245
Morristown, New Jersey 07962
Phone: (602) 313-5683
Fax: (602) 313-4559

PTO/SB/17 (12-04)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2006

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500.00

Complete if Known	
Application Number	10/717,086
Filing Date	November 19, 2003
First Named Inventor	Charles Q. Zhan
Examiner Name	Xiuqin Sun
Art Unit	2863
Attorney Docket No.	I20 06739US (HWEL01-06739)

METHOD OF PAYMENT (check all that apply)

☑ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 50-0208 Deposit Account Name: Munck Butrus P.C.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 20 or HP =	_____	x _____	= _____

HP = highest number of total claims paid for, if greater than 20

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	_____	x _____	= _____

HP = highest number of independent claims paid for, if greater than 3

Multiple Dependent Claims	Fee ($)	Fee Paid ($)
	_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____ / 50 =	_____ (round up to a whole number)	x _____	= _____

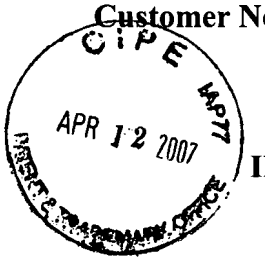
4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other: Appeal Brief Filing fee	$500.00

SUBMITTED BY

Signature	[signature]	Registration No. (Attorney/Agent) 39,308	Telephone (972) 628-3600
Name (Print/Type)	William A. Munck		Date April 9, 2007

DOCKET NO. I20 06739 US **PATENT**
CLIENT NO. HWEL01-06739
Customer No. 00128



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Charles Q. Zhan, et al.
U.S. Serial No.:	10/717,086
Filed:	November 19, 2003
For:	APPARATUS AND METHOD FOR IDENTIFYING DEFECTIVE VALVES
Group No.:	2863
Examiner:	Xiuqin Sun

MAIL STOP APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

APPEAL BRIEF

The Appellant has appealed to the Board of Patent Appeals and Interferences from the decision of the Examiner dated November 16, 2006, finally rejecting Claims 1-27. The Appellant filed a Notice of Appeal on February 9, 2007, which was received by the U.S. Patent and Trademark Office on February 12, 2007. The Appellant respectfully submits this brief on appeal.

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Real Party in Interest

This application is currently owned by Honeywell International Inc.

Related Appeals or Interferences

There are no appeals or interferences that will directly affect, be directly affected by, or have a bearing on the Board's decision in this pending appeal.

Status of Claims

Claims 1-27 have been rejected pursuant to a final Office Action dated November 16, 2006. Claims 1-27 are presented for appeal. A copy of all pending claims is provided in Appendix A.

Status of Amendments after Final

The Appellant filed an AMENDMENT AND RESPONSE TO OFFICE ACTION on December 18, 2006. The Examiner refused to enter the AMENDMENT AND RESPONSE, asserting that it did not place the application in better form for appeal by materially reducing or simplifying the issues for appeal.

SUMMARY OF CLAIMED SUBJECT MATTER

The following summary refers to disclosed embodiments and their advantages but does not delimit any of the claimed inventions.

In General

The present application is directed, in general, to an apparatus and method for identifying defective valves in a process control system. One embodiment of a system for identifying a defective valve is shown in Figure 1 of the Appellant's specification, which is reproduced below.

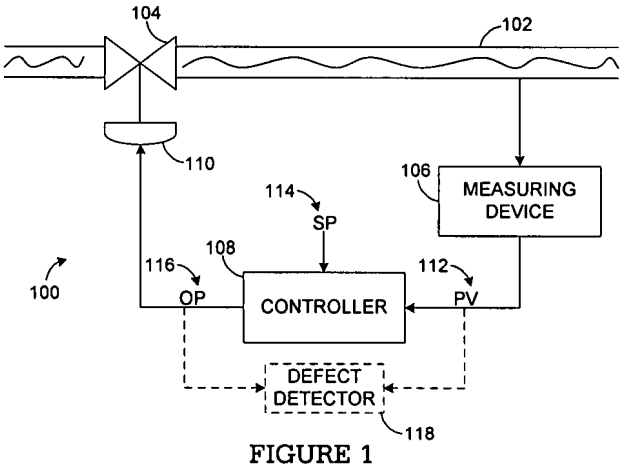


FIGURE 1

A valve 104 controls the rate at which one or more materials flow through a pipe 102. A measuring device 106 measures one or more characteristics associated with the material(s) flowing through the pipe 102, such as flow rate. The measuring device 106 outputs a process variable (PV) signal 112 identifying the measurements made by the measuring device 106. A controller 108 controls the opening and closing of the valve 104 using the process variable signal

112 provided by the measuring device 106 and a set point (SP) 114. The set point 114 identifies the desired value for the process variable signal 112. The controller 108 generates an output signal (OP) 116 controlling the extent to which the valve 104 should be opened or closed. A valve adjuster 110 uses the values in the output signal 116 to adjust the opening of the valve 104 or to allow the valve 104 to remain in its current position. (*Application, Pars. [019]-[022]*).

The controller 108 or a defect detector 118 also uses the process variable signal 112 and/or the output signal 116 to identify a possible defect in the valve 104. For example, the controller 108 or the defect detector 118 could identify when the valve 104 is suffering from valve hysteresis or valve stiction. Valve hysteresis occurs when the valve 104 is moving in one direction (opening or closing), the controller 108 instructs the valve 104 to move in the opposite direction by a specified amount, and the valve 104 moves in the opposite direction by less than the specified amount. Static friction or "stiction" occurs when the valve 104 fails to respond to pressure from the valve adjuster 110 until additional pressure is applied to the valve 104. At that point, the valve 104 jumps to a larger or smaller opening than desired. (*Application, Pars. [023]-[024]*).

The controller 108 or the defect detector 118 could perform wavelet decomposition to identify a possible defect in the valve 104. For example, Figures 3A and 3B of the Appellant's specification are reproduced below.

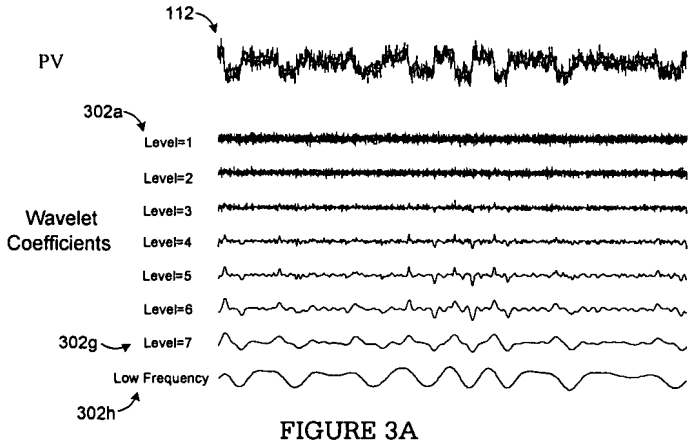


FIGURE 3A

As shown in Figure 3A, the process variable signal 112 can be decomposed to generate wavelet coefficients at multiple resolution levels 302a-302g. Low frequency content is also generated at level 302h. Each of the resolution levels 302a-302g represents different information associated with the process variable signal 112, such as changes in the process variable signal 112. The higher levels (starting at level 302a) represent higher-frequency changes in the process variable signal 112, and the lower levels (starting at level 302g) represent lower-frequency changes in the process variable signal 112.

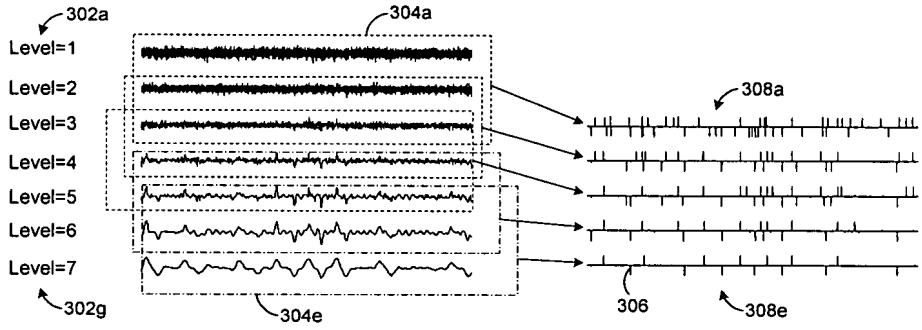


FIGURE 3B

As shown in Figure 3B, the controller 108 or the defect detector 118 can use these wavelet coefficients to identify jumps 306 in the process variable signal 112. For example, the controller 108 or the defect detector 118 could group the wavelet coefficients at different resolution levels 302a-302g into groups 304a-304e. The controller 108 or the defect detector 118 uses the groups 304a-304e to identify possible process variable jumps 306 at different resolution levels 308a-308e. Each jump 306 represents a possible location where the process variable signal 112 changes or jumps by a relatively large amount. (*Application, Pars. [036]-[040]*).

Figure 4 of the Appellant's specification is also reproduced below.

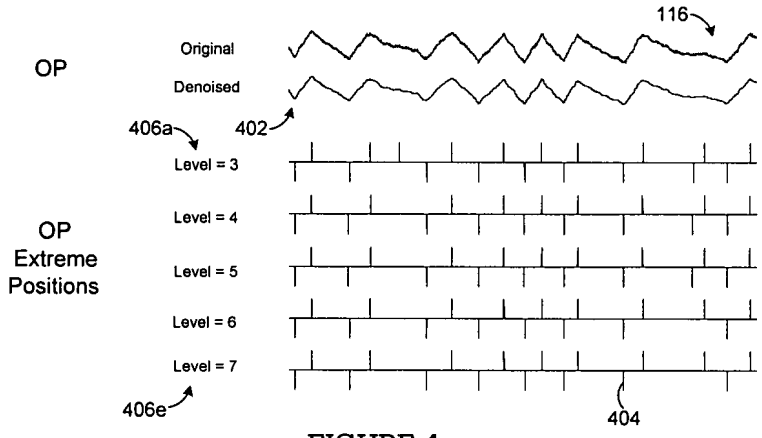


FIGURE 4

As shown in Figure 4, the controller 108 or the defect detector 118 could process the output signal 116 to identify extreme positions (high and low peaks) 404 in the output signal 116. These extreme positions can be identified at multiple resolution levels 406a-406e. (*Application, Pars. [0046]-[0048]*).

Using this information, the controller 108 or the defect detector 118 could identify stiction events associated with the valve 104. For example, Figure 5 of the Appellant's

specification is reproduced below.

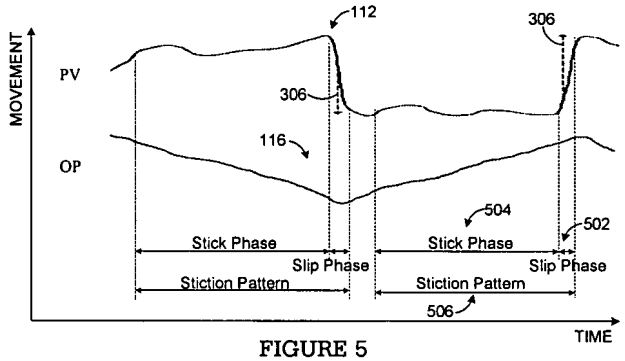


FIGURE 5

As shown in Figure 5, the controller 108 or the defect detector 118 can use jumps 306 in the process variable signal 112 and/or extreme positions 404 in the output signal 116 to identify stiction patterns 506 for each resolution level. A stiction pattern may include a stick phase 504 (a period when the valve 104 sticks) and a slip phase 502 (a period when the valve 104 moves excessively). (*Application, Pars. [051]-[055]*).

The controller 108 or the defect detector 118 can use the jumps 306 in the process variable signal 112, the extreme positions 404 in the output signal 116, and/or the stiction patterns to generate various indexes, which are used to select one of the resolution levels. A probability that the valve 104 is defective can then be determined using the indexes associated with the selected resolution level. (*Application, Pars. [058]-[076]*).

Support for Independent Claims

Note that, per 37 C.F.R. § 41.37, only the independent claims are discussed in this section. The discussion of the claims in this section is for illustrative purposes and is not intended to affect the scope of the claims.

Regarding Claim 1, a method includes identifying one or more operating characteristics associated with a valve (104). (*Application, Par. [088]*). The method also includes identifying one or more indicators (306, 404) of a possible defect in the valve at each of a plurality of resolution levels (308a-308e, 406a-406e) using at least one of the one or more operating characteristics. (*Application, Pars. [090] and [095]-[098]*). The method further includes generating a plurality of indexes associated with the resolution levels, where the indexes are based on the one or more indicators and each identify a likelihood of a valve defect. (*Application, Pars. [092] and [058]-[071]*). In addition, the method includes selecting one of the plurality of resolution levels using at least one of the indexes and determining an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level. (*Pars. [092] and [072]-[076]*).

Regarding Claim 9, an apparatus (108, 118) includes a memory and one or more processors. (*Application, Pars. [021] and [023]*). The memory is operable to store one or more operating characteristics associated with a valve (104). (*Application, Pars. [021], [023]-[024], and [088]*). The one or more processors are collectively operable to identify one or more indicators (306, 404) of a possible defect in the valve at each of a plurality of resolution levels (308a-308e, 406a-406e) using at least one of the operating characteristics. (*Application, Pars.*

[090] and [095]-[098]). The one or more processors are also collectively operable to generate a plurality of indexes associated with the resolution levels, where the indexes are based on the one or more indicators and each index identifies a likelihood of a valve defect. (*Application, Pars. [092] and [058]-[071]*). The one or more processors are further collectively operable to select one of the plurality of resolution levels using at least one of the indexes and to determine an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level. (*Application, Pars. [092] and [072]-[076]*).

Regarding Claim 15, a computer program is embodied on a computer readable medium and is operable to be executed by a processor. (*Application, Pars. [021] and [023]*). The computer program includes computer readable program code for identifying one or more indicators (306, 404) of a possible defect in a valve (104) at each of a plurality of resolution levels (308a-308e, 406a-406e) using at least one of one or more operating characteristics associated with the valve. (*Application, Pars. [090] and [095]-[098]*). The computer program also includes computer readable program code for generating a plurality of indexes associated with the resolution levels, where the indexes are based on the one or more indicators and each identifies a likelihood of a valve defect. (*Application, Pars. [092] and [058]-[071]*). The computer program further includes computer readable program code for selecting one of the plurality of resolution levels using at least one of the indexes and computer readable program code for determining an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level. (*Application, Pars. [092] and [072]-[076]*).

Regarding Claim 22, a system (100) includes a valve (104), a measuring device (106) operable to generate measurements of a process variable associated with operation of the valve, and a controller (108) operable to generate output values for adjusting the valve based on the process variable measurements. (*Application, Pars. [019]-[021]*). The system (100) also includes a defect detector (118) operable to identify one or more indicators (306, 404) of a possible defect in the valve at each of a plurality of resolution levels (308a-308e, 406a-406e) using at least one of the process variable measurements and the output values. (*Application, Pars. [023]-[024], [090], and [095]-[098]*). The defect detector (118) is also operable to generate a plurality of indexes associated with the resolution levels, where the indexes are based on the one or more indicators and each identifies a likelihood of a valve defect. (*Application, Pars. [092] and [058]-[071]*). The defect detector (118) is further operable to select one of the plurality of resolution levels using at least one of the indexes and determine an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level. (*Application, Pars. [092] and [072]-[076]*).

Regarding Claim 24, a method includes identifying one or more operating characteristics associated with a valve (104). (*Application, Par. [088]*). The method also includes identifying one or more indicators (306, 404) of a possible defect in the valve using at least one of the one or more operating characteristics. (*Application, Pars. [090] and [095]-[098]*). The method further includes identifying one or more stiction patterns (506) using the one or more indicators. (*Application, Pars. [051]-[055]*). In addition, the method includes generating one or more indexes associated with one or more of the stiction patterns (where each index identifies a

likelihood of a valve defect) and determining an overall probability of a valve defect using at least one of the one or more indexes. (*Application, Pars. [092] and [072]-[076]*).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Do Claims 1-27 recite patentable subject matter under 35 U.S.C. § 101?

2. Do Claims 26 and 27 recite subject matter not described in the specification as originally filed under 35 U.S.C. § 112, first paragraph?

ARGUMENT

Stated Grounds of Rejection

Claims 1-27 stand rejected under 35 U.S.C. § 101 as failing to recite patentable subject matter. Claims 26 and 27 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter not described in the specification as originally filed.

Legal Standards

35 U.S.C. § 101

Under 35 U.S.C. § 101, "anything under the sun that is made by man" is patentable subject matter. (*Diamond v. Chakrabarty*, 447 U.S. 303, 308-09, 206 U.S.P.Q. 193, 197 (1980)). However, there are exceptions to this broad statement, namely that abstract ideas, laws of nature, and natural phenomenon cannot be patented. (*See, e.g., Mackay Radio & Telegraph Co. v. Radio Corp. of America*, 306 U.S. 86, 94, 40 U.S.P.Q. 199, 202 (1939)). As a result, a patent application cannot patent every "substantial practical application" of an abstract idea, law of nature, or natural phenomena since that would effectively represent a patent on the abstract idea, law of nature, or natural phenomena itself. (*Gottschalk v. Benson*, 409 U.S. 63, 71-72, 175 U.S.P.Q. 673, 676 (1972)). A claim that applies a mathematical algorithm to "produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle" on its face "comfortably falls within the scope of § 101." (*AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1358, 50 U.S.P.Q.2d 1447, 1452 (Fed. Cir. 1999)).

Therefore, to be patentable, a claimed invention must produce a "useful, concrete and tangible result." (*State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149 F.3d 1368, 1373-74, 47 U.S.P.Q.2d 1596, 1601-1602 (Fed. Cir. 1998)). A claimed invention is "useful" when it satisfies the utility requirement of § 101. A claimed invention produces a "concrete" result when it can produce a result that is substantially repeatable or that substantially produces the same result again. A claimed invention produces a "tangible" result when a claim sets forth a "practical application" of a § 101 judicial exception to produce a "real-world result." The "tangible" requirement does not require that a claim be tied to a particular machine or apparatus or that a claim operate to change articles or materials. (*MPEP § 2106*).

35 U.S.C. § 112, First Paragraph

Under 35 U.S.C. § 112, first paragraph, a patent specification must contain a "written description of the invention." To satisfy the written description requirement, a patent specification must "describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention" at the time of filing. Newly added claim limitations must be supported in the specification "through express, implicit, or inherent disclosure." (*MPEP § 2163*).

Analysis of Examiner's Rejections

Each rejection is addressed separately below.

Ground of Rejection 1: Claims 1-27 stand rejected under 35 U.S.C. § 101 as failing to recite patentable subject matter

Claims 1-25

Claim 1 recites a method, which includes:

> identifying one or more operating characteristics associated with a valve;
>
> identifying one or more indicators of a possible defect in the valve at each of a plurality of resolution levels using at least one of the one or more operating characteristics;
>
> generating a plurality of indexes associated with the resolution levels, the indexes based on the one or more indicators and each identifying a likelihood of a valve defect;
>
> selecting one of the plurality of resolution levels using at least one of the indexes; and
>
> determining an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level.

The Examiner asserts that Claim 1 fails to produce a "useful, concrete and tangible" result. More specifically, the Examiner asserts that the claims are "directed to an algorithm for determining an overall probability of a valve defect rather than a practical application of the algorithm in the real world. The practical application of the claimed invention cannot be realized until the determined probability is conveyed to the user. For the result to be tangible it would need to [be] output to a user or displayed to a user or stored for later use." (*11/16/06 Office Action, Pages 2-3, Section 4*).

First, there is no requirement that a claim must produce a result that is "output to a user or displayed to a user or stored for later use." The Examiner has not and cannot cite any authority requiring one of these three specific options to be recited in Claim 1. Rather, the Examiner has

simply asserted that MPEP § 2106 and the Official Gazette notice dated November 22, 2005 entitled "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" support this requirement. However, MPEP § 2106 and the Official Gazette notice never once state that a result must be "output to a user or displayed to a user or stored for later use" for a claimed invention to be patentable.

Second, MPEP § 2106 and the Official Gazette notice do specifically spell out the test for determining whether a result is tangible. Both state that a claimed invention produces a "tangible" result when a claim sets forth a "practical application" of a § 101 judicial exception to produce a "real-world result."

Claim 1 recites a method for determining an overall probability of a valve being defective. The method includes "identifying one or more operating characteristics associated with a valve." Valves exist in the real world, and the one or more operating characteristics represent real-world behavior of a valve.

Claim 1 also recites "identifying one or more indicators of a possible defect in the valve at each of a plurality of resolution levels using at least one of the one or more operating characteristics." The one or more indicators of a possible valve defect are generated in the real world using real-world operating characteristics of the valve.

Claim 1 further recites generating a "plurality of indexes" associated with the resolution levels, where the indexes are "based on the one or more indicators" and each index identifies "a likelihood of a valve defect." The indexes are generated in the real world, using real-world indicators of a possible defect.

In addition, Claim 1 recites selecting one of the plurality of resolution levels "using at least one of the indexes" and determining an "overall probability of a valve defect" using "at least one of the indexes that is associated with the selected resolution level." The resolution level is selected using at least one of the real-world indexes, and the overall probability of a valve defect represents a real-world likelihood that a valve is suffering from a defect. The overall probability could then be used in any suitable manner, such as to schedule servicing of the valve if necessary. (*See, e.g., Application, Par. [093]*).

It is clear here that Claim 1 is directed to a "practical application" that produces a "real-world result." Claim 1 therefore complies with the "tangible" requirement as set forth in MPEP § 2106 and the Official Gazette notice.

The Examiner simply asserts that the claims are "directed to an algorithm for determining an overall probability of a valve defect rather than a practical application of the algorithm in the real world." (*11/16/06 Office Action, Pages 2-3, Section 4*). This statement by the Examiner is puzzling since it seems to imply that determining the overall probability that a real-world valve is defective is somehow a mere abstract idea.

Moreover, MPEP § 2106 states that while "abstract ideas, natural phenomena, and laws of nature are not eligible for patenting, methods and products employing abstract ideas, natural phenomena, and laws of nature to perform a real-world function may well be." MPEP § 2106 also states that a claim "must be considered as a whole to determine whether it is for a particular application of an abstract idea, natural phenomenon, or law of nature, and not for the abstract idea, natural phenomenon, or law of nature itself." Claim 1 is not claiming a law of nature.

Claim 1 is not claiming a natural phenomenon. Claim 1 is not claiming an abstract idea such as probability. Claim 1 recites a specific technique to determine an "overall probability of a valve defect," which if anything represents a useful and particular application of an abstract idea.

Third, the Examiner appears to confuse (i) a requirement that a claim specify a "practical application" that produces a "real-world result" and (ii) a requirement that the actual use of the "real-world result" be specified in the claims. Requirement (i) is proper and spelled out in MPEP § 2106 and the Official Gazette notice. Requirement (ii) is what the Examiner is applying to Claim 1 in this case and is improper. There is no requirement that the specific use of the "real-world result" be specified in the claims themselves. The requirement is simply that the claims recite a "practical application" that produces a "real-world result."

It is also important to note that the "practical application" is producing the "real-world result." The Examiner is requiring the Appellant to specify a "practical application" for the "real-world result." This is not the proper standard. The Appellant does not need to specify a "practical application" for the "real-world result" in order to comply with the "tangible" requirement. Rather, the Appellant only needs to specify a "practical application" that produces a "real-world result."

Here, Claim 1 spells out a specific procedure for determining an overall probability of a valve defect using one or more real-world operating characteristics of a real-world valve. The end result (the overall probability) is useful, concrete, and tangible.

For these reasons, the Appellant respectfully submits that Claim 1 recites patentable subject matter under § 101. For similar reasons, the Appellant respectfully submits that Claims

9, 15, 22, and 24 recite patentable subject matter under § 101.

Accordingly, the Appellant respectfully requests that the § 101 rejection of Claims 1-25 be withdrawn and that Claims 1-25 be passed to allowance.

Claim 26

In rejecting Claim 1, the Examiner asserts that Claim 1 fails to recite patentable subject matter because the "practical application of the claimed invention cannot be realized until the determined probability is conveyed to the user. For the result to be tangible it would need to [be] output to a user or displayed to a user or stored for later use." (*11/16/06 Office Action, Pages 2-3, Section 4*).

Claim 26 recites the method of Claim 1, which further includes:

> at least one of: storing, transmitting, and displaying the overall probability of the valve defect.

Based on the Examiner's own standard, this claim recites a "practical application" for the "real-world result." Therefore, under the Examiner's own standard, Claim 26 recites patentable subject matter.

Accordingly, the Appellant respectfully requests that the § 101 rejection of Claim 26 be withdrawn and that Claim 26 be passed to allowance.

Claim 27

Claim 27 recites:

> classifying the overall probability of the valve defect into one of a plurality of classifications; and
>
> notifying a user if the overall probability of the valve defect is classified into one of one or more specified classifications.

Claim 27 therefore recites a specific use of the "overall probability of the valve defect." The overall probability is classified, and a user is notified depending on how the overall probability is classified.

Claim 27 recites a useful, concrete, and tangible result – a notification provided to a user when an overall probability of a valve defect has been classified into a specified classification. Based on the Examiner's own standard, Claim 27 contains patentable subject matter under § 101.

Accordingly, the Appellant respectfully requests that the § 101 rejection of Claim 27 be withdrawn and that Claim 27 be passed to allowance.

Ground of Rejection 2: Claims 26 and 27 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement

Claim 26

Claim 26 recites the method of Claim 1, which further includes:

> at least one of: storing, transmitting, and displaying the overall probability of the valve defect.

The Appellant's specification recites that the controller 108 and the defect detector 118 can each include "any hardware, software, firmware, or combination thereof." As a particular example, the controller 108 and the defect detector 118 could each include "one or more software routines stored in at least one memory and executed by at least one processor." (*Application, Pars. [021] and [023]*).

In these types of computing devices, any data generated or determined by a processor is inherently stored. For example, any data generated or determined by a processor is always stored in some type of memory (whether in a register, cache, RAM, hard drive, or other memory). Therefore, any data generated or determined by a processor (such as an "overall probability of a valve defect") is inherently stored in some type of memory in the controller 108 or the defect detector 118.

Similarly, in these types of computing devices, any data generated or determined by a processor is inherently transmitted in some manner. For example, the data is transmitted over a wire or bus to a register, cache memory, or RAM module, over a wire or bus to a hard drive or other memory, or over a network connection for remote storage. Therefore, any data generated or determined by a processor (such as an "overall probability of a valve defect") is inherently

transmitted in some way in or by the controller 108 or the defect detector 118.

In addition, these types of computing devices are capable of displaying information. Moreover, the Appellant's specification includes various plots in Figures 6A and 6B. Each of these plots displays the overall probability of a valve defect for numerous valves. Therefore, the Appellant's specification clearly discloses plotting (i.e. graphically displaying) an overall probability of a valve defect.

For these reasons, the Appellant respectfully submits that Claim 26 is supported in the originally-filed specification "through express, implicit, or inherent disclosure." Accordingly, the Appellant respectfully requests that the § 112 rejection of Claim 26 be withdrawn and that Claim 26 be passed to allowance.

Claim 27

Claim 27 depends from Claim 26 and is rejected under § 112 only due to its dependence from Claim 26. As shown above, Claim 26 is at least inherently supported by the Appellant's original disclosure. Moreover, the recitations in Claim 27 are clearly supported in the originally-filed specification. (*See, e.g., Application, Par. [093]*).

For these reasons, the Appellant respectfully submits that Claim 27 is supported in the originally-filed specification. Accordingly, the Appellant respectfully requests that the § 112 rejection of Claim 27 be withdrawn and that Claim 27 be passed to allowance.

REQUESTED RELIEF

The Board is respectfully requested to reverse the outstanding rejections and return this application to the Examiner for allowance.

The Commissioner is hereby authorized to charge any fees connected with this communication (including any extension of time fees) or credit any overpayment to Munck Butrus Deposit Account No. 50-0208.

Respectfully submitted,

MUNCK BUTRUS, P.C.

Date: April 9, 2007

William A. Munck
Registration No. 39,308
Attorney for Appellant

P.O. Drawer 800899
Dallas, Texas 75380
Phone: (972) 628-3600
Fax: (972) 628-3616
E-mail: *wmunck@munckbutrus.com*

DOCKET NO. I20 06739 US **PATENT**
CLIENT NO. HWEL01-06739
Customer No. 00128

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Charles Q. Zhan, et al.
U.S. Serial No.:	10/717,086
Filed:	November 19, 2003
For:	APPARATUS AND METHOD FOR IDENTIFYING DEFECTIVE VALVES
Group No.:	2863
Examiner:	Xiuqin Sun

APPENDIX A - Claims Appendix

1. A method, comprising:

identifying one or more operating characteristics associated with a valve;

identifying one or more indicators of a possible defect in the valve at each of a plurality of resolution levels using at least one of the one or more operating characteristics;

generating a plurality of indexes associated with the resolution levels, the indexes based on the one or more indicators and each identifying a likelihood of a valve defect;

selecting one of the plurality of resolution levels using at least one of the indexes; and

determining an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level.

2. The method of Claim 1, wherein:

the one or more operating characteristics comprise at least one of: (i) measurements of a process variable associated with operation of the valve and (ii) values generated to control the operation of the valve; and

the one or more indicators comprise at least one of: (i) jumps in the process variable measurements and (ii) extreme positions in the generated control values.

3. The method of Claim 2, wherein:

the process variable measurements comprise measurements of a flow rate of one or more materials flowing through the valve; and

the generated control values comprise values used to adjust an opening of the valve and thereby adjust the flow rate.

4. The method of Claim 2, wherein identifying the one or more indicators at the plurality of resolution levels comprises:

performing wavelet decomposition on the process variable measurements to generate wavelet coefficients at the plurality of resolution levels;

grouping the wavelet coefficients at different resolution levels into groups; and

identifying the jumps in the process variable measurements at the plurality of resolution levels using the groups of wavelet coefficients.

5. The method of Claim 4, wherein identifying the one or more indicators at the plurality of resolution levels further comprises identifying the extreme positions in the generated control values using a number of jumps in the process variable measurements at each of the resolution levels.

6. The method of Claim 1, wherein generating the plurality of indexes comprises:

using the one or more indicators to identify one or more stiction events at each of the resolution levels, each stiction event comprising a stick phase and a slip phase; and

generating the plurality of indexes using at least one of the one or more stiction events, the stick phase of the one or more stiction events, and the slip phase of the one or more stiction events.

7. The method of Claim 1, wherein selecting one of the resolution levels comprises selecting the resolution level having the indexes resulting in a highest likelihood of a valve defect.

8. The method of Claim 1, wherein:

generating the plurality of indexes comprises identifying multiple sets of one or more stiction events using different operating characteristics and generating multiple sets of indexes using the sets of stiction events; and

determining the overall probability of a valve defect comprises determining a plurality of probabilities associated with the sets of indexes and using the plurality of probabilities to determine the overall probability.

9. An apparatus, comprising:

a memory operable to store one or more operating characteristics associated with a valve; and

one or more processors collectively operable to:

identify one or more indicators of a possible defect in the valve at each of a plurality of resolution levels using at least one of the operating characteristics;

generate a plurality of indexes associated with the resolution levels, the indexes based on the one or more indicators and each identifying a likelihood of a valve defect;

select one of the plurality of resolution levels using at least one of the indexes; and

determine an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level.

10. The apparatus of Claim 9, wherein:

the one or more operating characteristics comprise at least one of: (i) measurements of a process variable associated with operation of the valve and (ii) values generated to control the operation of the valve; and

the one or more indicators comprise at least one of: (i) jumps in the process variable measurements and (ii) extreme positions in the generated control values.

11. The apparatus of Claim 10, wherein the one or more processors are collectively operable to identify the one or more indicators at the plurality of resolution levels by:

performing wavelet decomposition on the process variable measurements to generate wavelet coefficients at the plurality of resolution levels;

grouping the wavelet coefficients at different resolution levels into groups;

identifying the jumps in the process variable measurements at the plurality of resolution levels using the groups of wavelet coefficients; and

identifying the extreme positions in the generated control values using a number of jumps in the process variable measurements at each of the resolution levels.

12. The apparatus of Claim 9, wherein the one or more processors are collectively operable to generate the plurality of indexes by:

identifying one or more stiction events at each of the resolution levels using the one or more indicators, each stiction event comprising a stick phase and a slip phase; and

generating the indexes using at least one of the one or more stiction events, the stick phase of the one or more stiction events, and the slip phase of the one or more stiction events.

13. The apparatus of Claim 9, wherein the one or more processors are collectively operable to select one of the resolution levels by selecting the resolution level having the indexes resulting in a highest likelihood of a valve defect.

14. The apparatus of Claim 9, wherein:

the one or more processors are collectively operable to generate the plurality of indexes by identifying multiple sets of one or more stiction events using different operating characteristics and generating multiple sets of indexes using the sets of stiction events; and

the one or more processors are collectively operable to determine the overall probability of a valve defect by determining a plurality of probabilities associated with the sets of indexes and using the plurality of probabilities to determine the overall probability.

15. A computer program embodied on a computer readable medium and operable to be executed by a processor, the computer program comprising computer readable program code for:

identifying one or more indicators of a possible defect in a valve at each of a plurality of resolution levels using at least one of one or more operating characteristics associated with the valve;

generating a plurality of indexes associated with the resolution levels, the indexes based on the one or more indicators and each identifying a likelihood of a valve defect;

selecting one of the plurality of resolution levels using at least one of the indexes; and

determining an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level.

16. The computer program of Claim 15, wherein:

the one or more operating characteristics comprise at least one of: (i) measurements of a process variable associated with operation of the valve and (ii) values generated to control the operation of the valve; and

the one or more indicators comprise at least one of: (i) jumps in the process variable measurements and (ii) extreme positions in the generated control values.

17. The computer program of Claim 16, wherein the computer readable program code for identifying the one or more indicators at the plurality of resolution levels comprises computer readable program code for:

performing wavelet decomposition on the process variable measurements to generate wavelet coefficients at the plurality of resolution levels;

grouping the wavelet coefficients at different resolution levels into groups;

identifying the jumps in the process variable measurements at the plurality of resolution levels using the groups of wavelet coefficients; and

identifying the extreme positions in the generated control values using a number of jumps in the process variable measurements at each of the resolution levels.

18. The computer program of Claim 15, wherein the computer readable program code for generating the plurality of indexes comprises computer readable program code for:

identifying one or more stiction events at each of the resolution levels using the one or more indicators, each stiction event comprising a stick phase and a slip phase; and

generating the indexes using at least one of the one or more stiction events, the stick phase of the one or more stiction events, and the slip phase of the one or more stiction events.

19. The computer program of Claim 15, wherein the computer readable program code for selecting one of the resolution levels comprises computer readable program code for selecting the resolution level having the indexes resulting in a highest likelihood of a valve defect.

20. The computer program of Claim 15, wherein:

the computer readable program code for generating the plurality of indexes comprises computer readable program code for identifying multiple sets of one or more stiction events using different operating characteristics and generating multiple sets of indexes using the sets of stiction events; and

the computer readable program code for determining the overall probability of a valve defect comprises computer readable program code for determining a plurality of probabilities associated with the sets of indexes and using the plurality of probabilities to determine the overall probability.

21. The computer program of Claim 15, further comprising computer readable program code for classifying the overall probability into one of a plurality of classifications.

22. A system, comprising:

a valve;

a measuring device operable to generate measurements of a process variable associated with operation of the valve;

a controller operable to generate output values for adjusting the valve based on the process variable measurements; and

a defect detector operable to:

identify one or more indicators of a possible defect in the valve at each of a plurality of resolution levels using at least one of the process variable measurements and the output values;

generate a plurality of indexes associated with the resolution levels, the indexes based on the one or more indicators and each identifying a likelihood of a valve defect;

select one of the plurality of resolution levels using at least one of the indexes; and

determine an overall probability of a valve defect using at least one of the indexes that is associated with the selected resolution level.

23. The system of Claim 22, wherein the defect detector forms part of the controller.

24. A method, comprising:

identifying one or more operating characteristics associated with a valve;

identifying one or more indicators of a possible defect in the valve using at least one of the one or more operating characteristics;

identifying one or more stiction patterns using the one or more indicators;

generating one or more indexes associated with one or more of the stiction patterns and each identifying a likelihood of a valve defect; and

determining an overall probability of a valve defect using at least one of the one or more indexes.

25. The method of Claim 1, wherein identifying the one or more indicators at one of the resolution levels comprises identifying one or more indicators at that resolution level using data associated with multiple resolution levels.

26. The method of Claim 1, further comprising:

at least one of: storing, transmitting, and displaying the overall probability of the valve defect.

27. The method of Claim 26, wherein the at least one of storing, transmitting, and displaying the overall probability of the valve defect comprises:

classifying the overall probability of the valve defect into one of a plurality of classifications; and

notifying a user if the overall probability of the valve defect is classified into one of one or more specified classifications.

DOCKET NO. I20 06739 US **PATENT**
CLIENT NO. HWEL01-06739
Customer No. 00128

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Charles Q. Zhan, et al.
U.S. Serial No.:	10/717,086
Filed:	November 19, 2003
For:	APPARATUS AND METHOD FOR IDENTIFYING DEFECTIVE VALVES
Group No.:	2863
Examiner:	Xiuqin Sun

APPENDIX B
Evidence Appendix

None.

DOCKET NO. I20 06739 US **PATENT**
CLIENT NO. HWEL01-06739
Customer No. 00128

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Charles Q. Zhan, et al.
U.S. Serial No.:	10/717,086
Filed:	November 19, 2003
For:	APPARATUS AND METHOD FOR IDENTIFYING DEFECTIVE VALVES
Group No.:	2863
Examiner:	Xiuqin Sun

APPENDIX C
Related Proceedings Appendix

None.